

Supplementary Information

The Emerging Circadian Phenotype of Borderline Personality Disorder: Mechanisms, Opportunities, and Future Directions

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Glossary of terms

Amplitude: the crest magnitude of a rhythmic time-series or peak of a fitted curve representing a circadian rhythm. The circadian amplitude indicates the strength of the observed rhythm.

Chronotype: a trait representing either preferred daily times for organising sleep-wake activities on a 'morningness-eveningness' personality dimension, or alternatively a trait representing the phase of entrainment of an individual, usually estimated using midsleep time. In both cases chronotype is used to estimate the underlying phase of the circadian clock.

Circadian Rhythm Sleep Wake Disorders: sleep disorders characterised by abnormal sleep/wake phase and structure with an assumed aetiological basis of underlying circadian rhythm misalignment. CRSWDs described in main text are Advanced Sleep-Wake Phase Disorder (also/previously called Advanced Sleep Phase Type [DSM-5, ICD-10], Advanced Sleep Phase Disorder, Advanced Sleep Phase Syndrome); Delayed Sleep-Wake Phase Disorder (also/previously called Delayed Sleep Phase Type [DSM-5, ICD-10], Delayed Sleep Phase Disorder, Delayed Sleep Phase Syndrome); Non-24-hour Sleep Wake disorder (also/previously called Non-24-hour Sleep-Wake Type [DSM-5], Free-Running type [ICD-10], Hypernycthemeral Syndrome).

Entrainment: process by which the internal day of circadian timing system is synchronised to environmental time cues (zeitgebers) to produce stable phase and period of the circadian rhythm.

Free-running: a condition in which the internal day of the circadian timing system oscillates at its intrinsic and self-sustained period. In humans the free-running circadian period (τ) is slightly greater than 24 hours. In laboratory studies this can be observed in a constant environment without entraining zeitgeber signals. In naturalistic scenarios this may occur where retinohypothalamic signal transmission to the SCN is compromised.

Internal day: the 24-hour representation of the endogenous circadian rhythm generated by the circadian timing system, comprised of the internal time of the SCN and phase alignment with peripheral circadian oscillators.

Phase advance: phase shift of the circadian rhythm such that the phase of entrainment occurs earlier in the day. Circadian rhythms that are earlier than the population norm are referred to as phase advanced.

Phase delay: phase shift of the circadian rhythm such that the phase of entrainment occurs later in the day. Circadian rhythms that are later than the population norm are referred to as phase delayed.

Phase of entrainment: represents a stable phase at which the internal day is embedded to the 24-hour environment; thus used to describe the timing of the circadian rhythm.

Suprachiasmatic nuclei: a bilateral complex located in the anterior hypothalamus that is the region responsible for the coordinated circadian programme of the circadian timing system.

Zeitgeber: environmental time cues that entrain the circadian clock such as the 24-hour light-dark signal. Other relevant time cues involve feeding times and social zeitgebers.